TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN BUILDING AND CIVIL ENGINEERING

EBC 2302 : THEORY OF STRUCTURES III

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: Pick Date Dec 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

- Pocket calculator

This paper consists of **FIVE** questions. Attempt any THREE questions.

Do not write on the question paper.

Mobile phones are not allowed in the examination room.

1. Using the three moment theorem, analyse the beam shown fig. 1 below and draw the bending moment and shear force diagram. (20 marks)

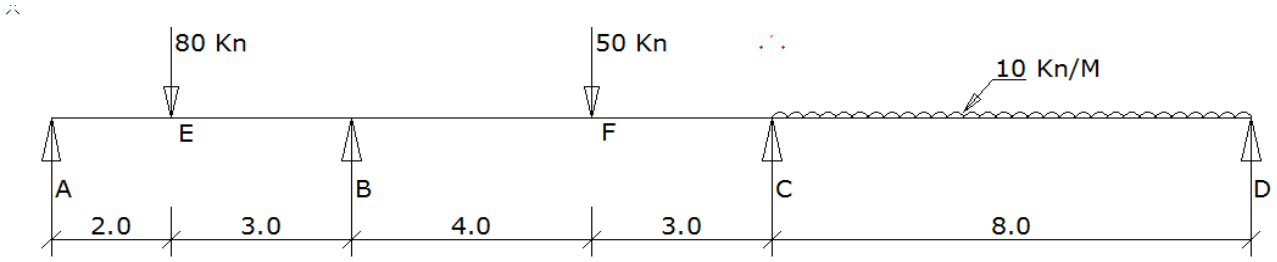

Fig. 1

2. Using the method of moment distribution, analyse the portal frame shown in fig. 2 below and sketch the bending moment diagrams. (20 marks)

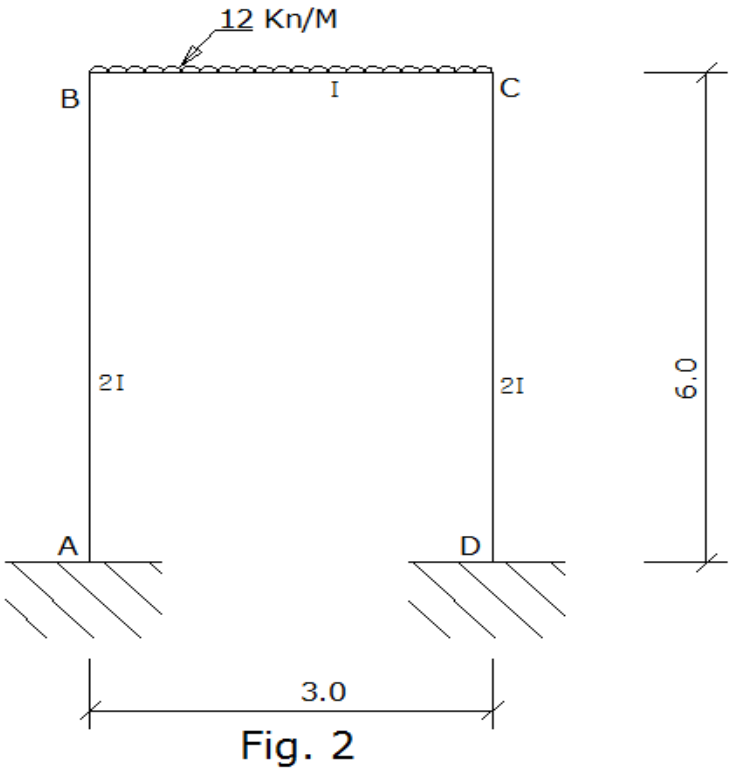

Fig. 2

3. Using the method of moment distribution analyse the beam shown on fig. 3 below and draw the bending moment and shear force diagrams.(20 marks)

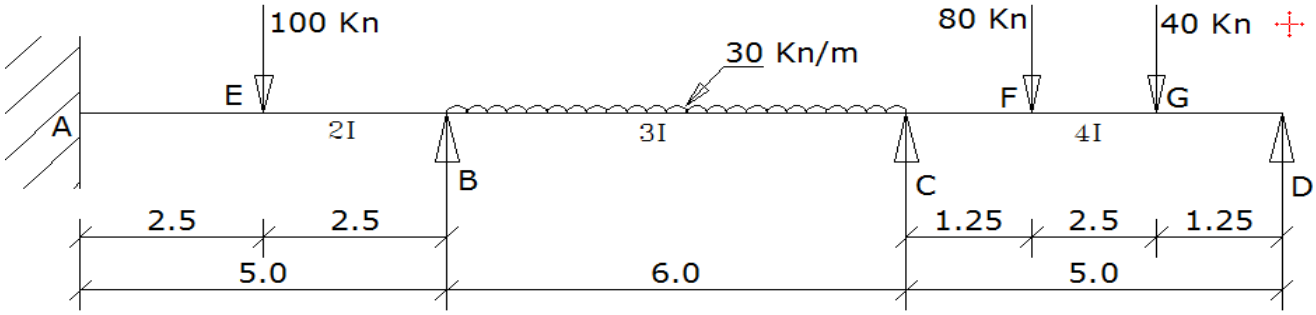

Fig. 3

4. (a) Define 'Influence lines' (5 marks)

(b) Two rolling loads 5Kn and 4Kn spaced at 2 m apart moves along a girder of 10 m span.

(i) Determine the maximum reactions at any support for any of the rolling loads.

(ii) Determine the maximum reactions at any support if either of the loads is at the center of the girder.

(iii) Determine the maximum positive and negative shear force at a section 4m from the left end if any of the loads takes a lead.

(15 marks)

5. (a) Derive the slope and deflection equations at the free end of a cantilever beam with a uniformly distributed load. (15 marks)

(b) Evaluate the slope and deflection at the end of a cantilever beam 2.0 m long carrying 5 Kn/m load over its entire length.
Take $EI=2.5x10^{12}mm^2$ (5 marks)